

Name: _____

Unit 4 - Review

1. Given the table of values:

x	y
4	-4
5	7
8	13
5	1

a) Represent this relation as a set of ordered pairs.

$(4, -4), (5, 7), (8, 13), (5, 1)$

b) Is the relation a function? Justify your answer.

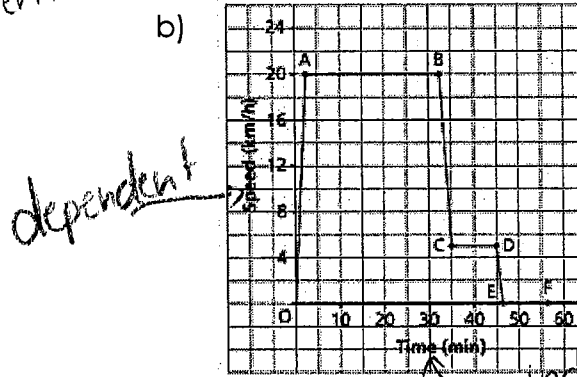
No The value of $x=5$ is used twice

2. For each relation state the independent and dependent variables.

a)

<i>r</i>	<i>A</i>
1	3.14
2	12.57
3	28.27
4	50.27

r is independent, *A* is dependent



c) $d = -4.9t^2$

d = dependent
 t = independent

d) $y = \sqrt{x} + 4$

x = independent
 y = dependent

3. Which relations are linear?

a) $y = 2 + 9x - 1$ **No**

b) $2x - 6y + 5 = 0$ **Yes**

c) $x + (-1) + 1 = 0$
No

d) $y - 2 = \frac{1}{3}(x + 1)$ **Yes**

e) $2 + 3 = 4$ **No**

4. Which relations are linear functions?

a)

x	y
4	-35
5	-42
6	-49
7	-56

Yes (slope is -7)

b)

x	y
26	42
23	46
20	50
17	56

No (slope is not constant)

c) $\{(2, 1), (2, 2), (3, 1), (3, 2)\}$

No
two points with the same x-value

5. Write each equation in function notation.

a) $y = -4x + 9$

$f(x) = -4x + 9$

b) $C = 12n + 75$

$C(n) = 12n + 75$

c) $D = 150 - 20n$

$D(n) = 150 - 20n$

d) $B = 3V$

$B(V) = 3V$

6. Given $f(x) = 4x - 10$;

a) Determine $f(3)$

$f(3) = 4(3) - 10$

$f(3) = 12 - 10$

$f(3) = 2$

b) Determine the value of x when $f(x) = 42$.

$42 = f(x)$

$42 = 4x - 10$

$52 = 4x$

$x = 13$

7. Given the function $f(x) = -5x + 3$; determine:

a) $f(2)$

$f(2) = -5(2) + 3$

$f(2) = -10 + 3$

$f(2) = -7$

b) $f(-5)$

$f(-5) = -5(-5) + 3$

$f(-5) = 25 + 3$

$f(-5) = 28$

c) $f(0)$

$f(0) = -5(0) + 3$

$f(0) = 3$

8. Given the function $f(x) = 2 + 3x$; determine the value of x when :

a) $f(x) = 11$

$11 = 2 + 3x$

$9 = 3x$

$3 = x$

b) $f(x) = 32$

$32 = 2 + 3x$

$30 = 3x$

$10 = x$

c) $f(x) = -10$

$-10 = 2 + 3x$

$-12 = 3x$

$-4 = x$

9. Given the graph of the function $f(x) = -3x + 1$.

a) Determine the value of the range associated with the value 1 of the domain.

$x = 1 \quad f(1) = -3(1) + 1$

$f(1) = -3 + 1 = -2$

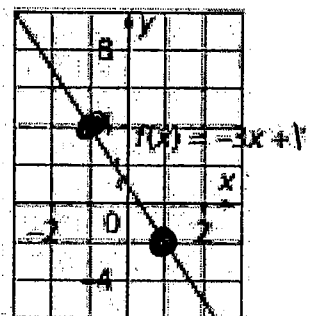
b) Determine the value of the domain associated with the value 4 of the range.

$y = 4$

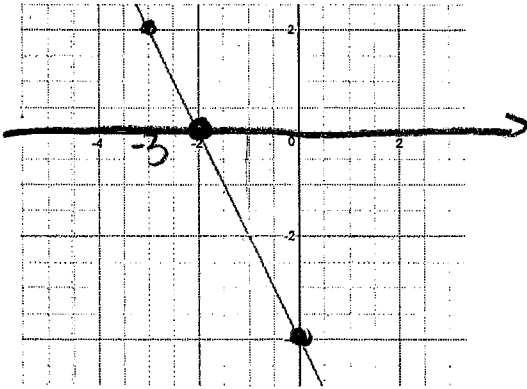
$4 = -3x + 1$

$3 = -3x$

$-1 = x$



10. Given the graph of the function $f(x)$. Determine:

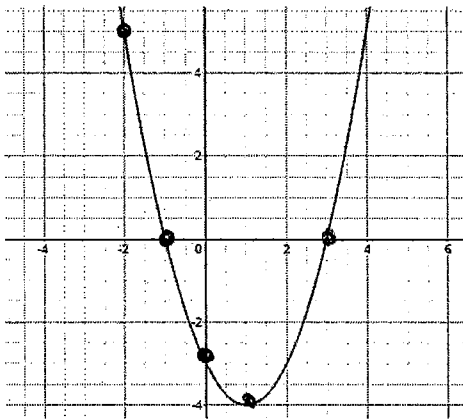


a) $f(-2) = \underline{02}$

b) $f(0) = \underline{-4}$

c) $x = \underline{-3}$ when $f(x) = 2$

11. Given the graph of the function $f(x)$. Determine :



a) $f(-2) = \underline{5}$

b) $f(0) = \underline{3}$

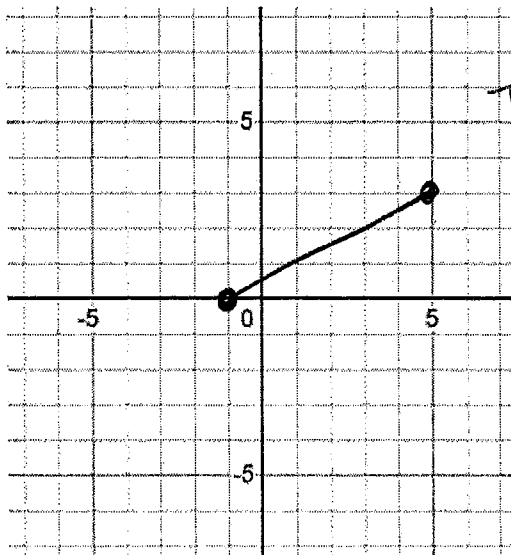
c) $x = \underline{-1 \text{ or } 3}$ when $f(x) = 0$

d) $x = \underline{1}$ when $f(x) = -4$

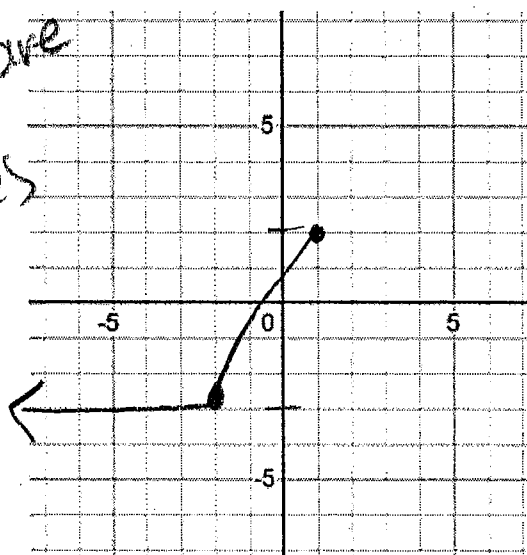
12. Sketch the graphic of a relation that has the specified domain and range.

a) domain : $-1 \leq x \leq 5$; range : $0 \leq y \leq 3$

b) domain : $x \leq 1$; range : $-2 \leq y \leq 2$



*There are
Many
choices*



13. The function $P(n) = 5n - 300$ describes the profit, P , in dollars, of a dance in which n students attended.

a) Identify the independent and dependent variables

$n = \text{students independent}$

$P = \$ \text{ dependent}$

b) Determine the value of $P(150)$. What does this number represent?

$$P(150) = 5(150) - 300$$

$$P(150) = 750 - 300$$

$$P(150) = 450$$

$\$450$

150 students
means a profit of $\$450$

c) Determine the value of n when $P(n) = 700$. What does the number represent?

$$700 = 5n - 300$$

$$1000 = 5n$$

$$200 = n$$

Profit of $\$700$
you will need 200 student

14. The equation $V(d) = -0.08d + 50$ defines the volume of gasoline, V , in litres, that remains in a vehicle's tank after a journey of d kilometres. The tank must be emptied before refueling.

a) Determine the value of $V(600)$. What does the number represent?

$$V(600) = -0.08(600) + 50$$

$$V(600) = -48 + 50$$

$$V(600) = 2$$

After 600 km
there will be
2L left in the
tank

b) Determine the value of $V(d) = 26$. What does the number represent?

$$26 = -0.08d + 50$$

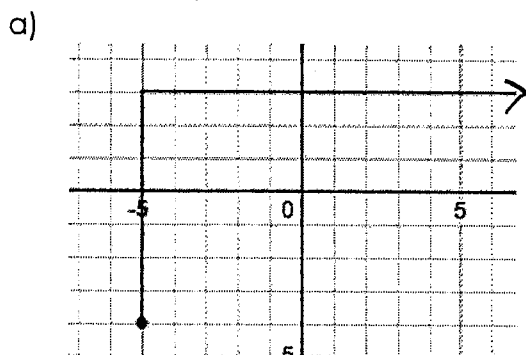
$$-24 = -0.08d$$

$$\frac{-24}{-0.08} = d$$

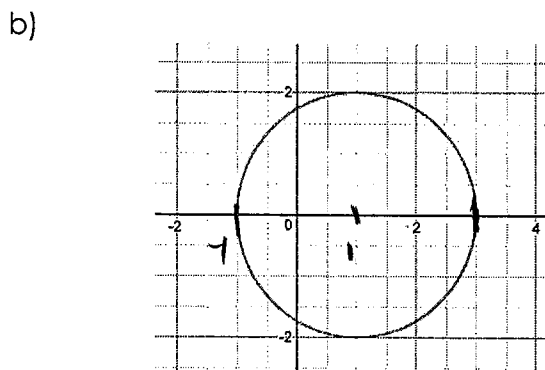
$$300 = d$$

$d = 300$
If there was 26 L left
in the tank, they
must have drove 300 km.

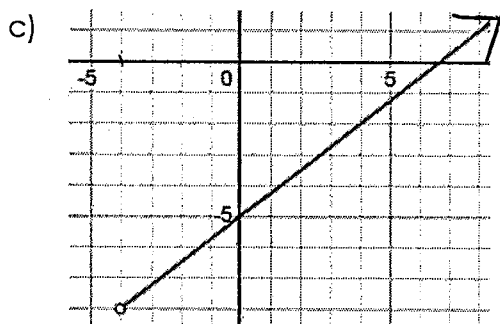
15. Determine the domain and range of each relation. Write them in set and interval notation. Determine if the relation is a function.



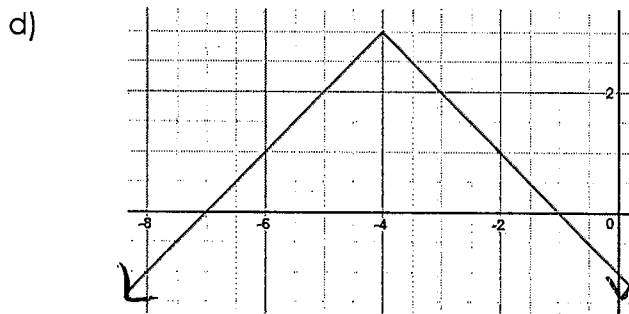
Domain: $\{x \geq -5\}$ $[-5, \infty)$
 Range: $\{y = 3\}$ $[3, 3]$
 Function: Yes **No**



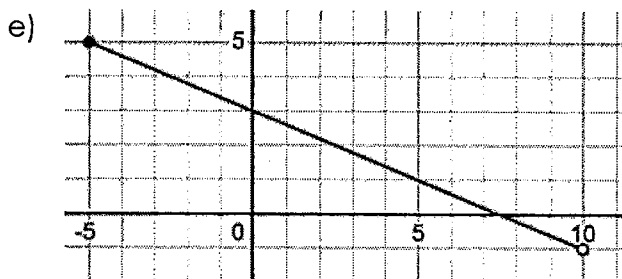
Domain: $\{-1 \leq x \leq 3\}$ $[-1, 3]$
 Range: $\{-2 \leq y \leq 2\}$ $[-2, 2]$
 Function: Yes **No**



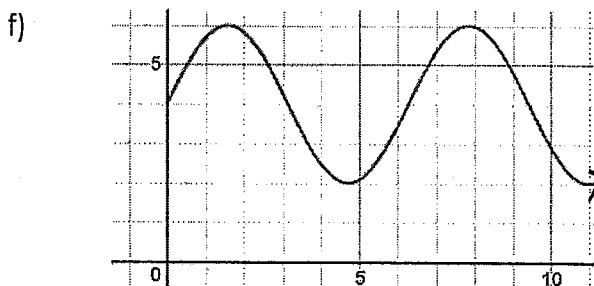
Domain: $\{x > -4\}$ $(-4, \infty)$
 Range: $\{y > -8\}$ $(-8, \infty)$
 Function: **Yes** No



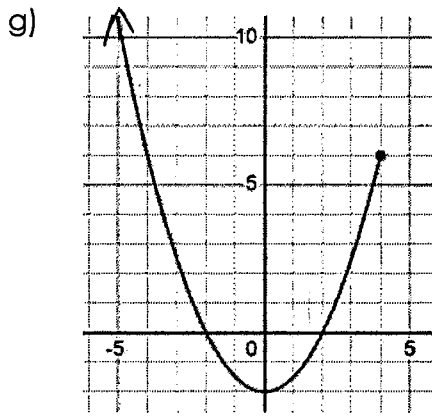
Domain: $\{x \in \mathbb{R}\}$ $(-\infty, \infty)$
 Range: $\{y \leq 4\}$ $(-\infty, 4]$
 Function: **Yes** No



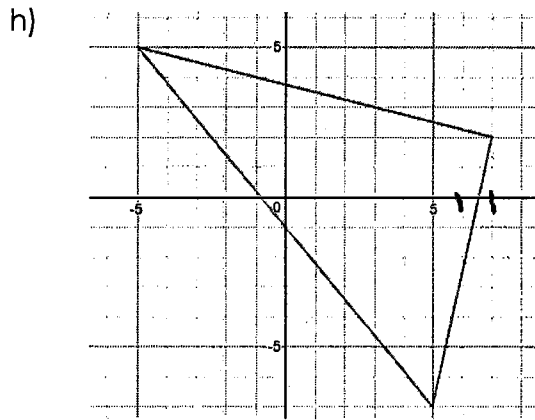
Domain: $\{-5 \leq x < 10\}$ $[-5, 10)$
 Range: $\{-1 < y \leq 5\}$ $(-1, 5]$
 Function: **Yes** No



Domain: $\{x \geq 0\}$ $[0, \infty)$
 Range: $\{2 \leq y \leq 6\}$ $[2, 6]$
 Function: **Yes** No

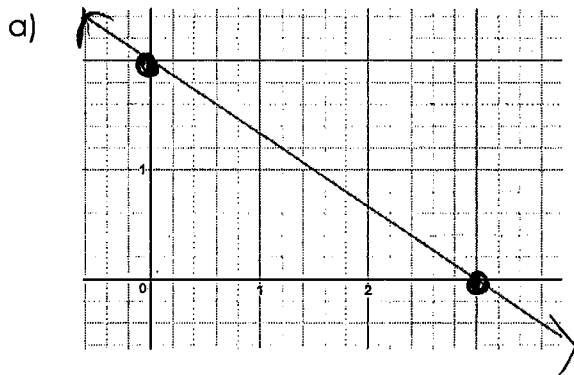


Domain: $\{x \leq 4\}$ $(-\infty, 4]$
 Range: $\{y > -2\}$ $[-2, \infty)$
 Function: Yes No

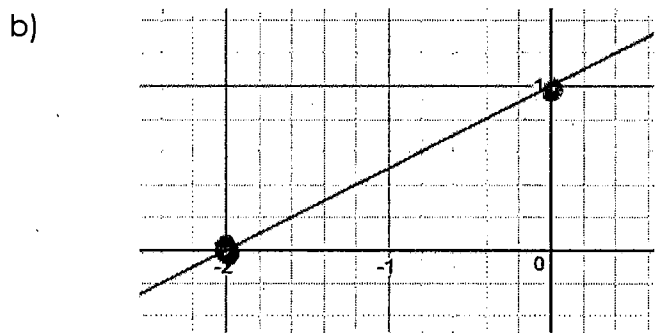


Domain: $\{-5 \leq x \leq 7\}$ $[-5, 7]$
 Range: $\{-7 \leq y \leq 5\}$ $[-7, 5]$
 Function: Yes No

16. Determine the coordinates for the intercepts.



x-intercept: (3, 0)
 y-intercept: (0, 2)



x-intercept: (-2, 0)
 y-intercept: (0, 1)

c) $4x + 3y = 18$
 $4x + 3(0) = 18$ $4(0) + 3y = 18$
 $4x = 18$ $3y = 18$
 $x = \frac{18}{4}$ $y = 6$
 $x = \frac{9}{2}$

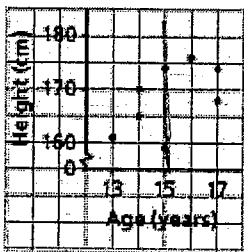
x-intercept: ($\frac{9}{2}$, 0)
 y-intercept: (0, 6)

d) $2x - 7y = -28$
 $2x - 7(0) = -28$ $2(0) - 7y = -28$
 $2x = -28$ $-7y = -28$
 $x = -14$ $y = 4$

x-intercept: (-14, 0)
 y-intercept: (0, 4)

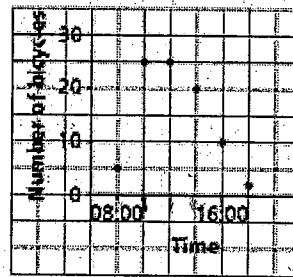
19. Which graph represents a function? Find the domain and range for each graph. Estimate if necessary.

a) Heights and Ages of 8 Students



Not a function

b) Number of Bicycles at School



Function

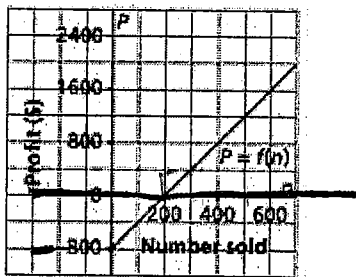
Domain $\{13, 14, 15, 16, 17\}$

D $\{8, 10, 12, 14, 16, 18\}$

Range $\{159, 165, 167, 170, 174, 176\}$

R $\{3, 5, 10, 20, 25\}$

20. The graph shows the profit, P dollars, on the sale of n baseball caps.



a) How many baseball caps have to be sold before the company make a profit?

$$n > 200$$

b) What is the profit on each baseball cap?

$$\text{rate of change} = \frac{\$400}{100 \text{ caps}} = \$4/\text{cap}$$

\$ 400
100 caps

c) How many caps need to be sold to make each profit:

i) \$600?

350 hats

ii) \$1200?

500 hats

d) In part c), when the profit doubles why does the number of baseball caps sold not double?

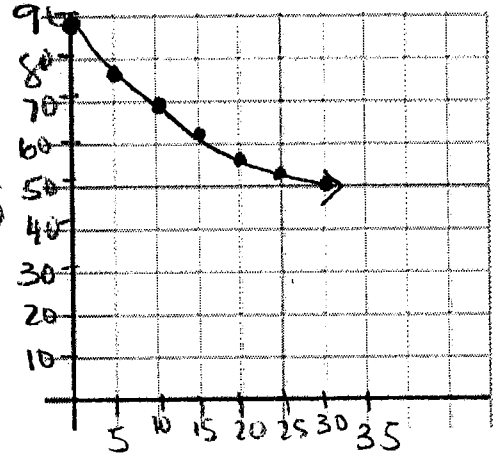
Initial start up costs
of \$800.

17. The data below show how the temperature of boiling water as it cools related to time.

a) Graph the data. Did you join the points? Why? *yes*

Time (min)	Temperature (°C)
0	89
5	78
10	69
15	62
20	57
25	53
30	50

Reasonable to have other times



b) Does the graph represent a function? How can you tell?

yes only 1 temp for each time.

18. Given the graphs

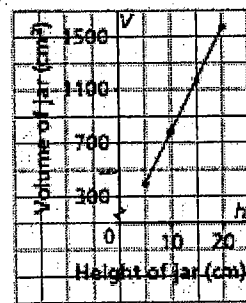
a) What does each graph represent?

Height of Jar vs volume of content

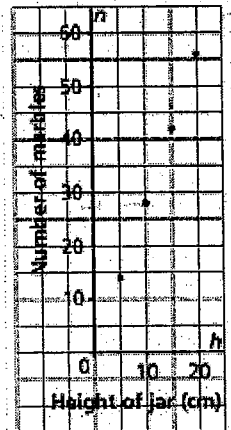
b) Identify the independent and dependent variables.

*independent = height
dependent = Volume*

i) Graph A



ii) Graph B



c) Find the domain and range for each graph. Estimate where necessary. Are there any restrictions on the domain and range? Why?

domain $\{5 \leq h \leq 20\}$

$\{5, 10, 15, 20\}$

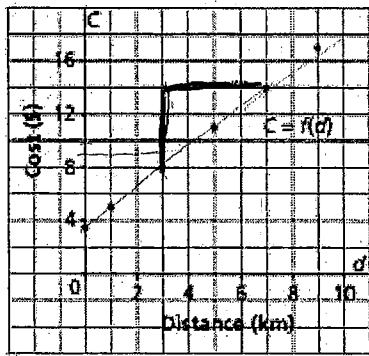
Range $\{400 \leq v \leq 1600\}$

$\{28, 42, 56\}$

d) Why are the points joined on one graph but not on the other?

graph ii) volume is measured in # of marbles, can't have part of a marble.

21. This graph shows the cost for a cab at Eagle Taxi Cabs. The cost, C , in dollars, is a function of the distance, d , in kilometres.



3 Km \$ 8
7 Km \$ 14

a) Determine the rate of change. What does it represent?

$$\begin{aligned} \text{rate of change} &= \frac{\text{change in Cost}}{\text{change in distance}} \\ &= \frac{6}{4} = \frac{3}{2} = 1.5 / \text{Km} \\ &\quad \text{cost per Km} \end{aligned}$$

b) What is the cost when the distance is 7 km?

$$d = 7 \\ \text{Cost} = \$ 14.00$$

c) What is the distance when the cost is \$ 9.50?

$$\text{Cost} = \$ 9.50 \\ \text{distance} \approx 3.5 \text{ Km}$$

Read graph

22. The table represents the relationship between the altitude in meters, A , of an aircraft and the time in minutes, t minutes, elapsed since the beginning of the descent.

t (min)	A (m)
0	9600
2	8200
4	6800
6	5400
8	4000

+2 (next to t), -14 (next to A) for each row transition.

a) Determines whether the relationship is linear from the value table. Justify your answer.

Linear

$$\begin{aligned} \text{change in } A &= -14 \\ \text{change in } t &= +2 \end{aligned}$$

b) Determines the rate of change.

$$\begin{aligned} \text{rate of change} &= \frac{-14}{2} \\ &= -7 \text{ m/min} \end{aligned}$$